# *Desiderata and Suggestions.*

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## No. 4.—MECHANICAL CONSTRUCTION OF CONFORMABLE FIGURES.

Is it possible to devise an apparatus for the mechanical construction of conformable figures; that is, figures which are similar as regards corresponding infinitesimal areas? The problem is to connect mechanically two points $P_1$, $P_2$ in such wise that $P_1$ (1) shall have two degrees of freedom (or be capable of moving over a plane area) its position always determining that of $P_2$: (2) that if $P_1$, $P_2$ describe the infinitesimal lengths $P_1Q_1$, $P_2Q_2$, then the ratio of these lengths, and their mutual inclination, shall depend upon the position of $P_1$, but be independent of the direction of $P_1Q_1$: or what is the same thing, that if $P_1$ describe uniformly an indefinitely small circle, then $P_2$ shall also describe uniformly an indefinitely small circle, the ratio of the radii, and the relative position of the starting points in the two circles respectively, depending on the position of $P_1$.

Of course a pentagraph is a solution, but the two figures are in this case similar; and this is not what is wanted. Any unadjustable apparatus would give one solution only: the complete solution would be by an apparatus containing, suppose, a flexible lamina, so that $P_1$ moving in a given right line, the path of $P_2$ could be made to be any given curve whatever.

Cambridge, *July 9th, 1879.*